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JAPANESE PATENT OFFICE

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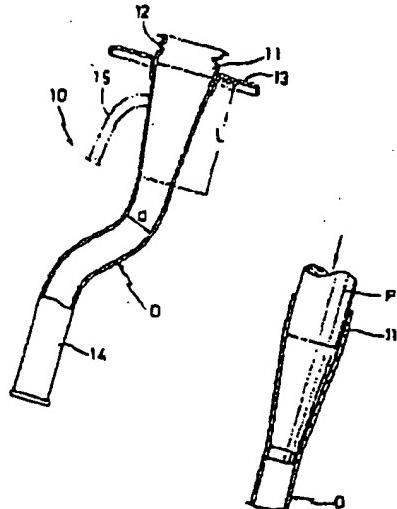
(54) FILLER TUBE

(57) Abstract:

PURPOSE: To form a filler tube using a single elementary tube instead of dividing the filler tube into plural portions by having the vicinity of the injection port of the raw tube expanded with a slow gradient, toward its entrance.

CONSTITUTION: A filler tube 10 is formed by having the vicinity of a fuel injection port 11 of a small diameter elementary tube D expanded with a slow gradient toward its entrance. When the elementary tube is expanded like this, a punch P formed along a desired gradient shape is being inserted from the direction of the fuel injection port 11 of the elementary tube D. In this case, the tube expansion ratio per axial unit length can be reduced and the insertion of the punch P when the elementary tube is expanded can be facilitated by slowly expanding the raw tube D, and thus the final tube expansion ratio can be increased.

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⑭ フィラーチューブ

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明細書
1.発明の名称 フィラーチューブ

2.特許請求の範囲

III. 油料注入口近傍をその入口方向に向けてねじり曲げて油管し、かつ、このねじ部分の軸方向長さを油管の一端部に對して十分に大きく設定したことを特徴とする企編よりなるフィラーチューブ。

3.発明の詳細な説明

本発明は自動車や農耕機等の駆動機に使用する油料を貯蔵するタンクに、油料供給側から油料を注入するためのフィラーチューブに関するものである。

この種のフィラーチューブは、目詰の網面・油料不純物等の各種の添加剤により油料注入口近傍の直角が約18~23度である。そこで、

フィラーチューブを企編で形成する場合、従来図1(a)に示すようにフィラーチューブ1の企編に亘つて油料注入口2と同様の直管3を用いて、これを適宜折曲する等して形成していた。ところが、かかるフィラーチューブ1は油料注入口2は前述した理由により大型化する必要があるが、専外の油料タンクに接続される部分(即ち下端部)は注入される油料を過濾されれば足り、前記油料注入口2に比べて小量化しても十分に性能は達成される。従つて、前記フィラーチューブ1は前述したよう企編に亘つて大型の直管3を用いて形成していたため、直管の増加および大型の直管3による付加費として加工費の増加を余儀なくされていた。

そこで、近年にあつては図2(b)に示すように、

肥料圧入口2より小径の部管B[たとえば、(27mm)を用い、肥料圧入口2近傍を直線状に並置して目的の肥料圧入口2に接するようとしたフィラーナチュープ1]がある。しかしながら、このように肥料圧入口2の部分を直線状に並置する方法では、部管B並行に対する並置部の肥料圧入口2の径の比で変わられる並置率が一般化約1.3～1.4程度が時間加工での加工限度とされている。このことは、並置性をより小さくし、使用される材料費削減、加工費低減、品質維持等の効果を発揮する上での境界を示している。従つて、これら効果を更に増すためには前記並置率を大きくすればよいことがわかる。そのため、前記並置率の限界を増大する手段として、第3回に示すようにフィラーナチュープ1の肥料圧入口部分3と回

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ナチュープを分離して構成することなく、本の部管で形成し、しかも、肥料圧入口近傍を直線の並置部界を大きく向上し、使用する材料費の削減、加工費の低減そして車体重量の軽減を図ることができるフィラーナチュープを提供することを目的とする。この目的を達成するために本発明は、肥料圧入口近傍をその入口方向に向けて斜めに傾斜して並置し、かつ、この傾斜部分の長さをまず約1倍以上にして十分に大きく設定したことにある。即ち、本発明のフィラーナチュープにあつては、肥料圧入口近傍をその入口方向に向けて斜めに傾斜して並置することにより、軸方向の単位長さ当たりの部管率が従来の時に大きくなることがなく、また、並置する時のポンチの挿入が容易となる等の理由により、小径の部管から直線部管を、直

外の肥料タンクに接続される部分3と共に分割し、前記肥料圧入口部分3は肥料圧入口2の所定径と同様の部管を用い、肥料タンク側を振り加工して小径部形成し、この小径部分3と共に前記回りシングへの接続部分4を接着等により固定することで、被回りシング部分4に用いられる部管Cを更に小径化(たとえば、約1.8～2)する方法が考えられている。しかし、このようだ3分割式のフィラーナチュープ1にあつては、分離した天端の部分3、4を接続するための加工費および分離された両者を固定するための加工費が高むと共に、接続部分4の部管C等の所定の品質を保たずために高層の技術を要し、やはり製品のコストアップを多いられてしまつという問題点があつた。

本発明はかかる従来の問題点に鑑みて、フィラ

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ナチュープの肥料圧入口を目的とする所定の径に並置することができるものである。

以下、本発明の一実施例を細大並びに詳細に説明する。

即ち、第4図は本発明の一実施例を示すフィラーナチュープ1の構造を示し、このフィラーナチュープ1は小径の部管Dを用いて、肥料圧入口1の部管をその入口方向に向けて斜めに傾斜して並置する。このとき、この傾斜部分の長さLを部管Dの一般部3に対して十分に大きさを設定する。たとえば、前記部管Dは1.8～2.0mmの日本規格JIS A材を使用し、前記傾斜部分の長さLを約1.2mmに設定して直線状に並置し、傾斜的な肥料圧入口1の径を削減したより広所定の1.8mm～2.0mmとなるようにしてある。ところで、このようだ肥料圧入

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(D) 1) 近側を近側形状に延長する場合は、図 3 図 A 示すように、目的の近側形状に沿つて形成されたボンチアを、本管口の近側注入入口 11 万円から内入しつつ延長するのであるが、このとき、本管口が依次に延長されていくことにより、始方向の本位長さ当たりの延長量が小さく、また、延長する側の前記ボンチアの插入が容易となることによりて、最終的な延長率を大きくすることができる。又、本実用例にあつては図 4 図 A 示すように近側注入入口 11 頭に国外のフィラーナンプを接着するためのねじ部 12 が形成され、また、このねじ 12 の下端部には前記近側注入入口 11 の外周に配置されるフランジ 13 がスポット溶接等によつて固定されている。このフランジ 13 は国外の直管バネル、たとえば本管注入用の端口が形成され

日開昭58-194627(3)
リニアエンジン等に適用され、前記近側注入管部分より下方の部材部分 14 は前記リニアエンジンの頭部を通して国外の燃料タンクに接続される。15 は燃料タンク内の空気を抜くためのベンチレーションチューブである。

以上の構成により、燃料注入入口 11 近側を依次に延長して延長することにより、本管部分 14 の本管口壁面に対する燃料注入入口 11 までの比、つまり延長率は約 1.0 ~ 1.8 程度と大きな差が得られる。即ち、このことは、本管口頭の小さな燃料でフィラーナンプ 10 を形成することができ、燃料供給の低減、加工費の低減、そして運送の便益を達成することができる。たとえば、本発明および従来のフィラーナンプを形成する際の直管部に対する W 形管カット費、側曲げ加工用ベンダー設置費、

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(E) 正寸カット時間と実寸対比して表わすと次表の様になる。

[表]

	本管径 × 壁厚	W 形管カット費	曲げ加工費 〔W 形管カット費〕	正寸カット 時間
本 例	Φ 31.0 × 1.2	12 円 / 1 本	200 円 (60%)	0.2 分 / 1 本
従 来	Φ 42.7 × 1.2	18 円 / 1 本	380 万円 (60%)	0.3 分 / 1 本
改 良	Φ 66.0 × 1.2	14 円 / 1 本	350 万円 (60%) 380 万円 (50%)	0.28 分 / 1 本

出、ここで、W 形管カット費とは、直管部の本管長さ (5600 mm ~ 8000 mm) をフィラーナンプ 10 の所定長さにカットするための直管ベースの費用、側曲げ加工用ベンダー設置費とは、フィラーナンプを燃料タンクに接続するため所定形状に曲折する必要ながあるが、このときの曲げ

加工を行なう際のベンダー設置費で、この曲げ加工費 (ベンダー費) も被加工材の厚さにより安い方かがコスト的に有利のため通常この安い方かが行なわれている。(E) 正寸カット時間とは、所定寸法にカットされた直管を曲げ加工等を施した後、最終的に製品規定寸法にカッター等でカットする際の加工時間で、被加工材の板厚、外径により決定される。また、フィラーナンプ 10 を直管に取付ける際、エンジン等の直管バネルの頭部からビス等を介してフランジ 13 を固定するのであるが、前記直管バネルの頭部は狭いスペースであるため、燃料注入入口 11 の頭部、底盤の頭部同士が接する場合に比べて、本実用例の頭部頭部が離れたことによつてスペースを広く確保でき、作業性を向上することができる。

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以上説明したように、本発明のフィラーナープはあつては、肥料注入入口近傍をその入口方向に向けて斜めに切削して部留し、かつ、この斜削部分の大きさを管径の一端径に対して十分に大きく設定したことによつて、施肥部端界を大きく向上できる。従つて、目的の肥料注入入口径を得るためにあつて、小さな径の管管を用いて一体成形により形成することができるため、使用する管管材料費の削減とフィラーナープを加工するための加工費の低減によって製品のコストダウンを図ることができ、また、重量の削減をも達成することができる。更に、肥料注入入口近傍を傾斜させることによつて吸付スペースを広く確保でき、吸付作業性の向上を図ることができるというされた効果を有する。

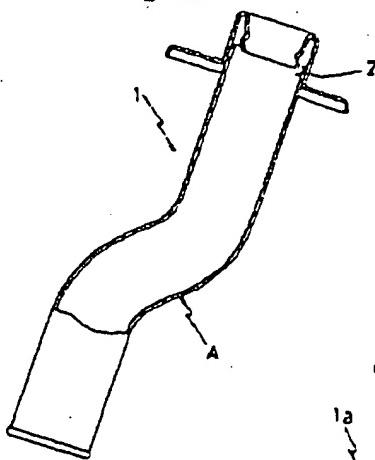
4 四面の簡単な説明

第1図、第2図、第3図は天へ延びるフィラーナープを示す断面図、第4図は本発明のフィラーナープの一実施例を示す断面図、第5図は本発明のフィラーナープを形成する際の一手段を示す視明図である。

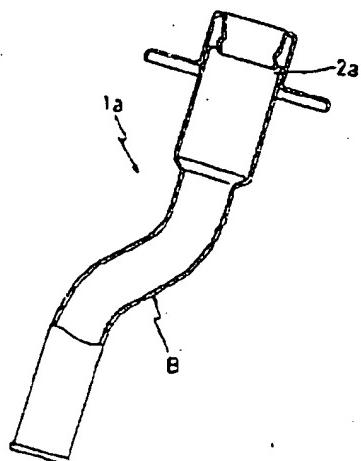
1. 1a, 1b, 1c, 1d…フィラーナープ。
2. 2a, 2b, 2c…肥料注入入口。A, B, C, D…水管。L…斜削部分の大きさ。

代理人 志賀吉士 

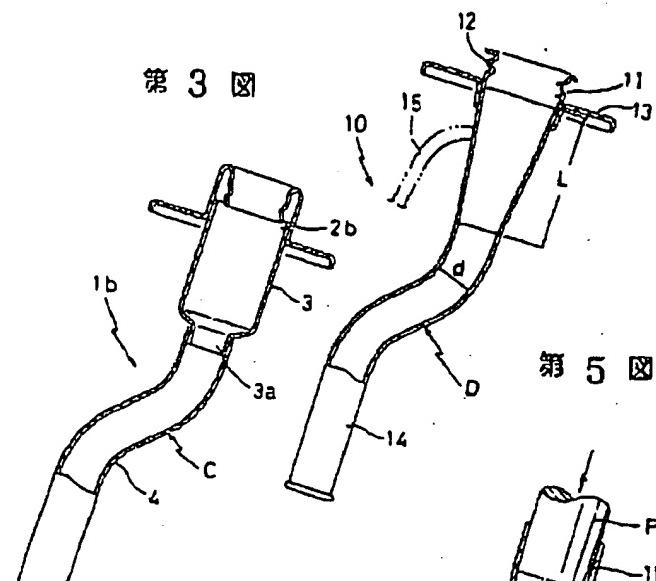
第1図



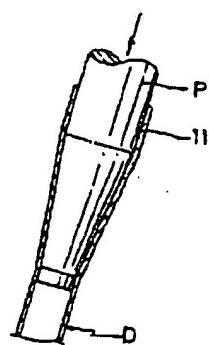
第2図



第4図



第5図



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(21) Patent Application No.: H8-280984
(22) Patent Application Date: October 23, 1996
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(S4) [Title of the Invention] Vehicle Fuel Inlet Opening Structure

(S7) [Abstract]

[Purpose] To reduce the filler tube diameter to prevent air pollution caused upon fuel filling without sacrificing the fuel-filling characteristic.

[Solution Means] Having the tube general area, 11a, of the filler tube, 11, smaller in diameter than the neck area, 12, makes the gap between the fuel liquid column and (the tube inside) smaller during fuel filling, and prevents evaporated fuel from externally flowing from the fuel inlet opening. Also, having the nozzle insertion restriction hole, 15, in the shutter plate, 14, in a vertically-oblong shape makes swinging of the fuel filler nozzle, 7, in the vertical direction free, and the base area of fuel filler nozzle 7 can be securely engaged/held at the threaded area, 13, of the fuel inlet opening. Thus, enlargement of the tube diameter in tube general area 11a, which causes fuel flow resistance, for allowing a swing motion is not needed, and both the holding characteristic of fuel filler nozzle 7 and the fuel filling characteristic can be satisfied.

[Claims]

[Claim 1] A vehicle fuel inlet opening structure, which is characterized by having a threaded area at the filler tube neck area opening end inside periphery; a shutter plate, at the neck mid area, which is provided with a nozzle insertion restriction hole that selectively restricts insertion of the fuel filler nozzle which is inserted from the aforementioned opening end and engaged/held at the threaded area; a tube general area which is connected to the neck area that is smaller in diameter than the neck area; and the nozzle insertion restriction hole in the aforementioned shutter plate is a vertically-oblong hole allowing a swing motion in the vertical direction of the fuel filler nozzle.

[Claim 2] The vehicle fuel inlet opening structure of Claim 1 which is characterized in that the threaded area and the shutter plate are provided in an inner tube which is fit and secured in the neck area of the filler tube.

[Detailed Explanation of the Invention]

[0001]

[Technology Field to Which the Invention Belongs] This invention relates to a vehicle fuel inlet opening structure.

[0002]

[Prior Art] Figure 3 shows a conventional vehicle fuel inlet structure where 1 is the filler tube of which the neck area protrudes into and is joined to the vessel, 5, which is joined to the peripheral edge of the opening area, 4, of the vehicle outer panel, 3.

[0003]

A threaded area, 6, is formed on the inside periphery of the opening in the neck area, 2, for securing the filler cap (not shown) with threads.

[0004]

Fuel filler nozzles have different diameters for leaded gasoline and for non-leaded gasoline, and vehicles using non-leaded gasoline are provided with a shutter plate, 8, in the mid area of the neck area, 2, with a nozzle insertion restriction hole, 9, which allows insertion of the nozzle for non-leaded gasoline that has a small diameter, and does not allow insertion of the nozzle for leaded gasoline that has a large diameter.

[0005]

The fuel filler nozzle, 7, is provided with a spiral line, 10, on the outer periphery at the base area, so that nozzle 7 inserted into neck area 2 at fuel filling can be held by engagement of spiral line 10 with threaded area 6 at the inside periphery of the opening of neck area 2, that is, the fuel inlet opening.

[0006]

[Problems the Invention is to Solve] Filler tube 1 needs to be large in diameter to some extent so that fuel filler nozzle 7 can be easily inserted into the fuel inlet opening at neck area 2, but also filler tube 1 needs to be as small in diameter as possible so as not to create much gap between the fuel liquid column and tube inside during fuel filling for prevention of air pollution by evaporated fuel external flowing from the fuel inlet opening. Thus, as shown in Fig. 3, neck area 2 of filler tube 1 is enlarged in diameter for assurance of insertion ease of fuel filler nozzle 7 and, at the same time, a small diameter in tube general area 1a as drawn by an imaginary line is required so as not to create much gap between the fuel liquid column and the tube inside during fuel filling.

[0007]

However, when tube general area 1a is made small in diameter, and if the front tip of fuel filler nozzle

7 interferes with the inside surface of tube general area 1a when fuel filler nozzle 7 is inserted into nozzle insertion restriction hole 9 of shutter plate 8, the swing motion of fuel filler nozzle 7 in the vertical direction is restricted at the contact point between fuel filler nozzle 7 and the inside surface of tube general area 1a and the contact point between (the nozzle) and nozzle insertion restriction hole 9 edge, and engagement of spiral line 10 which is on the outer periphery of fuel filler nozzle 7 at the base area with threaded area 6 at the fuel inlet opening edge is not possible and the holding characteristic of fuel filler nozzle 7 is lost.

[0008]

Therefore, for assurance of the fuel filler nozzle 7 holding characteristic, an expanded-diameter area, 1b, the diameter of which is somewhat larger than the tube general area as shown by the solid lines in the drawing, is needed for allowance of the swing motion of fuel filler nozzle 7 in the vertical direction. As a result, the fuel-filling characteristic is sacrificed because of the increased flow resistance of the fuel that is flowing out from fuel filler nozzle 7 at the step area between expanded-diameter area 1b and tube general area 1a.

[0009]

Thus, this invention presents an automobile fuel inlet opening structure with a filler tube having a small diameter without sacrificing the fuel-filling characteristic, which can prevent air pollution at the time of fuel filling.

[0010]

[Means to Solve the Problems] In Claim 1, the structure is characterized by having a threaded area at the filler tube neck area opening end inside periphery; a shutter plate, at the neck mid area, which is provided with a nozzle insertion restriction hole that restricts insertion of the fuel filler nozzle which is inserted from the aforementioned opening end and engaged/held at the threaded area; a tube general area which is connected to the neck area that is smaller in diameter than the neck area; and the nozzle insertion restriction hole in the aforementioned shutter plate is a vertically-oblong hole allowing a swing motion in the vertical direction of the fuel filler nozzle.

[0011]

In Claim 2, the structure is characterized in that the threaded area and the shutter plate described in

Claim 1 are provided in an inner tube that is fit and secured in the neck area of the filler tube.

[0012]

[Effect(s) of the Invention] According to Claim 1, since the tube general area of the filler tube is smaller in diameter than the neck area, not much gap between the fuel liquid column of flowing fuel and the inside surface of the tube general area can be easily generated, and external flow of evaporated fuel from the fuel inlet opening can be prevented, and since the nozzle insertion restriction hole in the shutter plate provided in the neck area is made as a vertically-oblong hole which can allow swing motions of the inserted fuel filler nozzle in the vertical direction, the fuel filler nozzle will not be restricted at the inside surface of the tube general area or at the nozzle restriction hole in the shutter plate and can freely swing in the vertical direction. Thus, the fuel filler nozzle can be securely engaged/held in the threaded area on the inside periphery at the opening end in the neck area without forming an expanded-diameter area for allowance of the swing motion of the fuel filler nozzle in the vertical direction at the joint area between the tube general area and neck area and, therefore, both the fuel filler holding characteristic and the fuel filling characteristic can be improved.

[0013]

According to Claim 2, in addition to the effects of Claim 1, since the threaded area and shutter plate are provided in the inner tube that is secured in the neck area of the filler tube, provision of this threaded area and shutter plate can be done easily.

[0014]

[Working Forms of the Invention] One working form of the invention is discussed with illustrations where the same symbols are used as for the conventional structure.

[0015]

With reference to Fig. 1 and Fig. 2, 11 is the filler tube and its neck area, 12, is made large in diameter for easy insertion of the fuel filler nozzle, 7. The open end of neck area 2, i.e. the fuel inlet opening end, is protruded into the vessel, 5, which is joined to the periphery of the opening area, 4, of the vehicle outer panel, 3, and (the fuel inlet opening end) is connected to vessel 5 at the protruding area.

[0016]

Also, tube general area 11a which follows neck area 12 of filler tube 11 is made smaller in diameter

than neck area 12 so that not much gap between the fuel liquid column and the (tube) inside surface is created when fuel is fed from the fuel filler nozzle 7 that is inserted in the fuel inlet opening.

[0017]

The connecting area between neck area 12 and tube general area 11a is formed in a tapered shape so that the front end of inserted nozzle 7 will not interfere, and the center line of tube general area 11a is offset in the lower direction from the center line of neck area 12 for easy insertion of fuel filling nozzle 7, as a result, the upper side of the taper area has a larger slope (than the lower side).

[0018]

Threaded area 13 is provided on the inside periphery at the opening end of neck area 12 for securing the filler cap (not shown), and shutter plate 14 with nozzle insertion restriction hole 15 that allows the diameter for the designated fuel filler nozzle is provided at the mid area of neck area 12. In this working form, this threaded area 13 and shutter plate 14 are provided in inner tube 16 which is fit and joined inside neck area 12.

[0019]

And, nozzle restriction hole 15 in shutter plate 14 is a vertically oblong hole which allows swing motions in the vertical direction of fuel filler nozzle 7 inserted into nozzle insertion restriction hole 15. That is, the minor axis (of the oblong hole) allows entry of only designated fuel filler nozzle 7, and the major axis is formed in the vertical direction.

[0020]

With the structure of this working form, tube general area 11a which follows neck area 12 of filler tube 11 is made smaller in diameter than neck area 12 for prevention of gap creation between the fuel liquid column of fuel fed from the fuel filler nozzle 7 and the inside surface of tube general area 11a. Thus, escape of evaporated fuel through a gap area to the environment through the fuel inlet opening can be prevented and air pollution due to external escape of evaporated fuel at the time of fuel filling can be prevented.

[0021]

Also, when fuel filler nozzle 7 is inserted into the fuel inlet opening at the end of neck area 12 and through nozzle insertion restriction hole 15 in shutter plate 14 which is provided in the mid area of neck

area 12 at the time of fuel filling, fuel filler nozzle 7 can be freely swung vertically for assured engagement and holding of spiral line 10 provided on the outside (of the nozzle) at its base area into threaded area 13 at the inside periphery of the opening end of neck area 12, because nozzle insertion restriction hole 15 is formed as a vertical-oblong hole which allows swing motions in the vertical direction.

[0022]

Therefore, fuel filler nozzle 7 can be assuredly engaged and held at the end of the fuel inlet opening without forming an expanded-diameter area for allowing swing motions in the vertical direction of fuel filler nozzle 7 in the connecting area between tube general area 11a and neck area 12. Also, since there is no step that would cause fuel flow resistance due to a diameter-expanded area in tube general area 11a, both the holding characteristic of fuel filler nozzle 7 and fuel filling characteristics can be improved.

[0023]

Also in this working form, since threaded area 13 and shutter plate 14 are provided in inner tube 16 which is to be fit and secured inside neck area 12, this threaded area 13 and shutter plate 14 can be easily provided in neck area 12.

[Brief Explanation of the Drawings]

[Fig. 1] Cross section drawing illustrating one working form of the invention.

[Fig. 2] Drawing of view A-A in Fig. 1.

[Fig. 3] Cross section drawing that shows a conventional structure

[Explanation of Reference Materials]

7 Fuel filler nozzle

11 Filler tube

11a Tube general area

12 Neck area

13 Threaded area

14 Shutter plate

15 Nozzle insertion restriction hole

16 Inner tube

Fig. 1

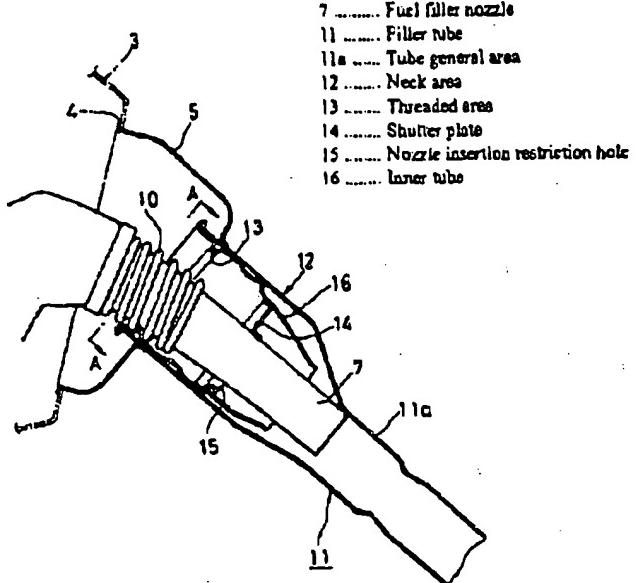


Fig. 2

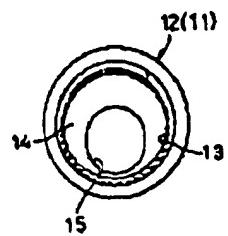
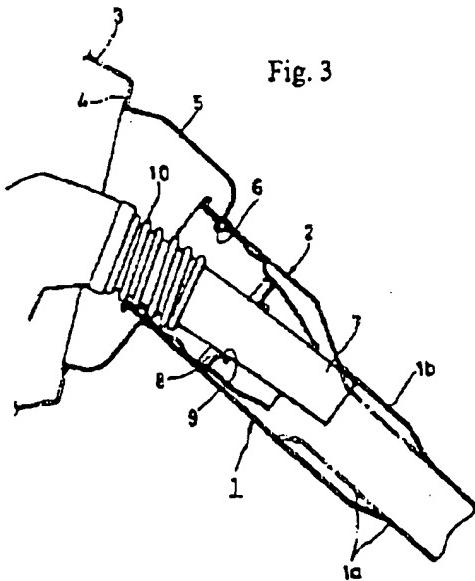


Fig. 3



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This is to certify that the above-stated document was translated by Japan-America Management, Ltd. from Japanese into English, and that it represents an accurate and faithful rendition of the original text to the best of my knowledge and belief.

By:

Mario Ciricola
Manager
March 24, 2004